

## Claims:

1. Isolated nucleic acid sequence coding for a polypeptide having acetohydroxy acid synthetase (AHAS) activity selected from the group consisting of:
  - 5 a) a nucleic acid sequence according to SEQ. ID No: 1 or SEQ. ID NO: 3;
  - b) a nucleic acid sequence comprising in position 21 and 22 a base triplet coding for Asp and Phe, respectively;
  - 10 c) a nucleic acid sequence hybridising under stringent conditions with those of a) or b);
  - d) a nucleic acid sequence having a homology of at least 70% with those of a) or b);
  - e) a nucleic acid coding for a polypeptide having at least 80% homology on amino acid level with the polypeptide coded by a) or b);
  - 15 f) a nucleic acid coding for a polypeptide with improved activity and/or selectivity and/or stability as compared with the polypeptide coded by a) or b), prepared by
    - 20 i) mutagenesis of a nucleic acid of a) or b),
    - ii) ligating the nucleic acid sequence obtainable from i) into a suitable vector followed by transformation into a suitable expression system and
    - 25 iii) expression and detection of the critical polypeptide with improved activity and/or selectivity and/or stability;
  - 30 g) polynucleotide containing at least 15 successive bases of the polynucleotide sequences of a) - f).
2. A polypeptide selected from the group consisting of:
  - a) a polypeptide coded by a nucleic acid sequence according to Claim 1;
  - b) a polypeptide having a sequence in accordance with SEQ. ID NO: 2 or SEQ. ID NO: 4;
  - 35 c) a polypeptide which is at least 84 % homologous to

- a polypeptide with SEQ. ID NO: 2 or SEQ. ID NO. 4,  
without the activity and/or selectivity and/or  
stability of the polypeptide being substantially  
reduced as compared with the polypeptide with SEQ.  
ID NO: 2 or SEQ. ID NO: 4.
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3. Plasmids, vectors, micro-organisms comprising one or  
more nucleic acid sequences according to Claims 1.
4. Primers for preparing - by means of PCR - or  
hybridisation probes for detecting the nucleic acid  
sequences according to Claim 1.
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5. A process for preparing improved rec-polypeptides with  
acetohydroxy acid synthetase (AHAS) activity starting  
from nucleic acid sequences in accordance with Claim  
1,  
characterised in that
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- a) the nucleic acid sequences are subjected to  
mutagenesis,
- b) the nucleic acid sequences obtainable from a) are  
cloned in a suitable vector and these are transferred  
into a suitable expression system and
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- c) the polypeptides with improved activity and/or  
selectivity and/or stability which are formed are  
detected and isolated.
6. rec-polypeptides or nucleic acid sequences coding for  
these, obtainable in accordance with Claim 5.
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7. The use of the polypeptides in accordance with Claim 2  
or 6 to prepare enantiomer-enriched branched-chain  
amino acids.
8. Use of the nucleic acid sequences in accordance with  
Claim 1 or 6 to prepare an amino acid producing micro-  
organism.
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9. Process for the production of a branched-chain amino acid using a polypeptide of Claim 2.
10. Vector pECKA or pECKA/ilvBNC.
11. Micro-organisms: DSM15652, DSM15651, DSM15650.